

DEPARTMENT OF THE ARMY  
U.S. Army Corps of Engineers  
Washington, DC 20314-1000

ETL 1110-2-548

CECW-ED

Technical Letter  
No. 1110-2-548

31 March 1997

**Engineering and Design  
COMPOSITE MATERIALS FOR CIVIL  
ENGINEERING STRUCTURES**

**1. Purpose.** This engineer technical letter (ETL) provides basic information and references on background, evaluation, and design of fiber-reinforced plastic (FRP) materials to assist structural design engineers who are considering the use of FRP on civil works projects. This information will help the engineer evaluate the suitability of FRP materials for structural applications, and will be useful in preparing performance specifications for procurement of suitable composite components and structures.

**2. Applicability.** This ETL applies to HQUSACE elements and USACE commands having responsibilities for the design of civil works projects.

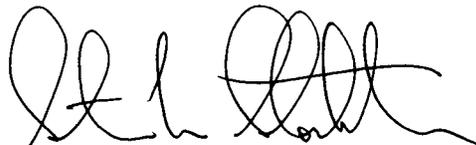
**3. Background.** Composite materials, as discussed herein, refer to fiber/matrix combinations such as fiberglass/epoxy and are commonly referred to as fiber-reinforced plastics. This ETL is intended for use by design engineers who are considering the use of composite materials on civil engineering projects. Structural applications are the primary focus of the ETL.

**4. Policy.**

*a. Applications.* Applications of composite materials can be categorized as nonstructural, secondary structural, or critical structural applications. Nonstructural and secondary structural applications of composite materials can be utilized when they offer cost or performance advantages. Critical structural applications shall not be used except in consultation with and as approved by CECW-E. Details regarding the various types of applications are included herein.

*b. Procurement specification.* Sufficient attention must be given to the design requirements, design quality assurance, and fabrication quality assurance during the development of a performance specification and contract drawings. Details with respect to these items are also included herein.

FOR THE DIRECTOR OF CIVIL WORKS:



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